

NORTH CAROLINA
OCCUPATIONAL SAFETY AND HEALTH EDUCATION AND RESEARCH CENTER

SUMMARY ANNUAL REPORT
July 1, 2009 – June 30, 2010

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SUBMITTED BY:
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North Carolina Occupational Safety and Health Education and Research Center

The purpose of the North Carolina Occupational Safety and Health Education and Research Center (NC OSHERC) is to train practitioners and researchers in the academic disciplines of Industrial Hygiene (IH), Occupational and Environmental Medicine (OEM), Occupational Health Nursing (OHN), Occupational Safety and Ergonomics (OS&E), and Occupational Epidemiology (OE). The program also provides continuing education for professionals in these areas who seek to maintain and update their skills. Program trainees will be well equipped to achieve the occupational safety and health objectives outlined in Healthy People 2010 and continue to develop skills as addressed in the IOM report: Safe Work in the 21st Century. The NC OSHERC is administered by an Executive Committee consisting of Center Director (Bonnie Rogers, DrPH, COHN-S, LNCC, FAAN) who also serves as the Program Director for OHN; Deputy Director (Judy Ostendorf, MPH, COHN-S, CCM, FAAOHN); Leena Nylander-French, PhD, IH Program Director; Dennis Darcey, MD, MSPH, FACOEM, OEM Program Director; David Kaber, PhD, OS&E Program Director; David Richardson, PhD, OE Program Director; and Kathleen Buckheit, MPH, Director of Continuing Education and Outreach and Hazardous Substance Training Programs. All programs are located at the University of North Carolina, Chapel Hill, except OEMR which is at Duke University and OS&E which is at North Carolina State University.

This report focuses on major accomplishments/highlights in program areas, including the impact of ERC programs within the applicable DHHS Region IV. The period covered by this report is 7/1/09-6/30/10. During this period, the following major accomplishments have been achieved.

Major Accomplishments

Outreach efforts have been outstanding by all faculty with enormous amounts of participation with community and fostering translation of research to practice via numerous publications, collaborative sponsorships of courses, presentations, and consultations. Our NORA Interdisciplinary Seminar Series has been presented on campus and webcast so that all NIOSH funded students have been able to attend these required seminars along with outreach to the larger occupational safety and health community. All disciplines have been represented. The NORA Seminars have continued to discuss research pertinent to NORA and to have global participation.

The NC OSHERC Newsletter (News-E) continued to be distributed to more than 20,000 members of the occupational safety and health community. It included information about each ERC program area and pertinent information about occupational safety and health.

Nine Pilot Project applications were received. Three were awarded: "Determination of Penetration Patterns of HDI Monomer and its Oligamers in Human Skin" (Sheila Flack, Zachary Robbins working with Dr. Leena Nylander-French), "Can Criminal Background Checks Predict Employee Violence" (Matthew Pierce working with Dr. Carol Runyan), and "Work Restrictions Among Duke University Employees during Pregnancy" (Kristen Kucera).

Industrial Hygiene Program - Director: Leena Nylander-French, PhD

The Industrial Hygiene (IH) Program supported 3 doctoral students, including 1 minority student, and 1 Master's student during the academic year 2009-2010. Two IH trainees, Sheila Flack and Linda Gaines (Nylander-French, advisor), received their doctoral degrees in Environmental Sciences and Engineering on May 9th, 2010. The IH trainees delivered 7 poster and/or oral presentations of their research findings in both national and international scientific meetings during the spring and fall of 2010. Linda Gaines received student travel award from UNC-CH Curriculum of Toxicology to present her doctoral research at the Society of Toxicology Annual meeting in Salt Lake City, UT, March 7-11, 2010. During 2010, the IH trainees have published 4 manuscripts, two have been accepted for publication, and one has been submitted for publication. The Journal of Environmental Monitoring featured our trainees' research "Effect of creatinine and specific gravity normalization on urinary biomarker 1,6-hexamethylene diamine" on the magazine cover (Gaines *et al.*, JEM 12(3):591-599, 2010). During the summer 2010, the IH trainees began field work on our NIOSH supported research project (R01-OH009364) to investigate the effectiveness of protective clothing to prevent diisocyanate exposure, a collaboration with the University of Washington IH Program. Further, two IH trainees were successful in obtaining a pilot grant from NC Occupational Safety and Health Education and Research Center Pilot Projects Program to investigate metabolic pathways associated with exposure to 1,6-hexamethylene diisocyanate and risk of developing asthma. The research conducted by the IH trainees has generated new and critical knowledge associated with dermal and inhalation exposure to 1,6-hexamethylene diisocyanate along with urine and blood biomarker data and risk of developing adverse health effects including asthma. In addition, we continue to provide trainees with research experience in conducting field studies to develop exposure assessment methods, to investigate exposure-dose-response relationships, and to calibrate models for the optimal control of exposure.

Occupational and Environmental Medicine - Program Director: Dennis Darcey, MD, MSPH, FACOEM

The Duke Occupational and Environmental Medicine Residency Program (OEMR) continues to have a regional impact in DHHS Region IV by training occupational medicine physicians, providing extensive occupational health education opportunities for practicing occupational health and safety professionals and conducting research relevant to

preventing hazardous occupational and environmental exposures and disease. The Duke program currently has two NIOSH funded residents. The program graduated one resident this past year who is working in a Preventive Medicine clinic position in North Carolina, Region IV. Both residents presented research findings at the 2010 national meeting of the American College of Occupational Medicine. Diane Ballerino-Regan, MD, MPH, MS, Duke University, "Pre-term Delivery of Tijuana's Working Women – Associated Risk Factors: A Case-controlled study" (Abstract 804563). Qilin Song, Duke University, "Risk Factors for Syphilis and Sexually Transmitted Infections Among Female Sex Workers in Seven Provinces of China" (Abstract 800301 - Poster P-041). Qilin Song, Duke University, "HIV/AIDS Knowledge, HIV-Risk Related Behaviors and Availability of HIV-Related Health Services Among Female Sex Workers in Seven Provinces of China" (Abstract 803832- Poster P-042).

Duke Occupational Medicine faculty provided Continuing Medical Education training for 2,115 occupational health professionals in medicine, nursing, safety, and industrial hygiene employed in industry, government, and academia in region IV. The Annual Carolinas Occupational Medicine Conference sponsored by the NC OSHERC was attended by practicing occupational medicine physicians throughout North and South Carolina and Virginia. 2009-2010 Duke OEM Funded Research Projects include, but are not limited to:

- Laboratory Animal Allergy Prevention National Practice Survey
- Effectiveness of patient lift equipment
- National building trades medical screening program
- United Against Diabetes and Cardiovascular Disease
- Preventing Blood & Body Fluid Exposures during Surgical Procedures
- 20-Yr Trends in Work-related Injuries & Disorders among Carpenters

Occupational Health Nursing Program - Program Director: Bonnie Rogers, DrPH, COHN-S, LNCC, FAAN

The Occupational Health Nursing (OHN) Program has been part of the NC OSHERC for more than 30 years. The goal of the Program is to provide education, training, and research experiences as appropriate to occupational health nursing professionals, so as to transfer learned knowledge to protect and promote the health of the workforce. During this reporting period four trainees were admitted and five trainees graduated.

Two program graduates published nine articles in professional publications. Current students published two continuing education articles in the AAOHN Journal during this reporting period. Dr. Bonnie Rogers was appointed as Vice Chairperson on the Institute of Medicine (IOM) "Committee on Respiratory Protection for Health care Workers in the Workplace Against Novel H1N1 Influenza", reports were generated from the committee's work for CDC and OSHA. An article in the New England Journal of Medicine was also published, titled "Novel H1N1 Influenza and Respiratory Protection for Health Care Workers". (N Engl Med 361:1823, Nov.5, 2009 *Perspective*.) The OHN Program faculty continues to actively participate in the NC OSHERC continuing education/outreach efforts, which focus on DHHS Region IV. Offered annually are the "OHN Certification Review" and the "Occupational Health Nursing: Introduction to Principles and Practice" courses each year.

Occupational Safety and Ergonomics Program - Program Director: David B. Kaber, PhD

The major accomplishments for the Occupational Safety & Ergonomics (OSE) component this year have included recruiting and supervision of new trainees, new faculty recruiting, and student graduations. Michael Clamann (PhD student), Meghan Rogers (MS student), Kinley Taylor (MS) and Chad Uy (MS) all joined the program last fall. Will Heath (MS) began training in spring 2010. These students have all identified thesis or dissertation research topics (e.g., work-related musculoskeletal disorders in large-animal veterinary operations, risk factors to hand hygiene in outpatient clinic operations, biomechanical modeling of wrist torque in detergent bottle handling). With respect to specific student research activities, Heath and Uy attended the *Int. Conf. on Fall Prevention and Projection*, Rogers attended the *Appl. Human Factors & Ergonomics Conf.*, and Taylor has published with co-authors two conference proceeding papers through the *Annual Meeting of the Human Factors & Ergonomics Soc.* and the *AAAI Fall Symp. on Dialog with Robots*. Beyond the addition of student trainees to our program, we recruited a new adjunct faculty member, Dr. Naomi Glasscock, to support instruction in occupational biomechanics and an undergraduate occupational ergonomics course. Faculty activities have also included publication of nine journal articles, acceptance of three articles and submission of another six. Finally, one NIOSH-supported trainee, Matt Diering, graduated in spring 2010 with a masters in industrial engineering. His thesis was entitled, "Ergonomic Evaluation of Scaffolding Task Interventions for Power Plant Maintenance." Matt Diering took employment as a process engineer with 3M Corporation in South Carolina.

The major impacts the OSE program area has had on the region have occurred through student internships and applied research projects along with faculty instruction of on-line and short courses. This past summer, Kinley Taylor interned at a local hospital (Rex Hospital) conducting ergonomics studies of nurse and physician use of computer equipment and work environments to identify job stressors and risk factors. Meghan Rogers completed an applied research project for a local veterinary clinic (Triangle Veterinary Emergency Clinic) on an ergonomic evaluation of small animal operations as

a basis for new facility design. Beyond these student impacts, David Kaber taught “Human Factors & Systems Design” (ISE 540) in spring 2010 to six regional professionals through the NC State Engineering On-line Program (<http://engineeringonline.ncsu.edu/>). Nelson Couch taught short-courses through the Winter and Summer Institutes of the Continuing Education component of the NC OSHERC, including fundamentals of industrial safety and laboratory safety, Tim McGlothlin also instructed short courses on ergonomics in the workplace and for production facilities.

Occupational Epidemiology - Program Director: David Richardson, PhD

Occupational Epidemiology is an allied research training program that has been part of the NC OSHERC since 2001. Trainees are engaged in high-quality research on occupational health and safety.

There are currently two trainees in the epidemiology program. Trainee Jerrod Nelms is developing his dissertation on the topic of workplace and community characteristics as risk factors for robbery-related homicide on-the-job. The second trainee, Alex Kiel, is developing a dissertation in the area of radiation epidemiology with a focus on mortality among US Department of Energy workers. Program director Dr. David Richardson was appointed by President Obama to the Advisory Board on Radiation and Worker Health.

Continuing Education Program - Program Director: Kathleen Buckheit, MPH, COHN-S/CM/SM

Since 1976, the Continuing Education (CE) Program has provided quality opportunities for occupational safety and health professionals. A substantial need for this service is evident, based on needs assessments, outreach, recruitment activities, and course evaluations. CE Program objectives are used as measures of success and are being met. Course evaluations serve as quality assurance and confirm that courses are effectively and efficiently delivering the CE programs and services. Faculty participation includes both academic and non-academic faculty, who are experienced practitioners and consultants and represent all occupational health and safety disciplines, offering a unique blend of theoretical and practical experience. All faculty continue to engage in outreach with professional associations and participate as course directors, planners, presenters, evaluators, and technical advisors.

New courses are offered every year. Some were presented in partnership with the South Eastern Atlantic College of Occupational and Environmental Medicine (SEACOEM) Annual Symposium (formally COEMA) and two conferences in partnership with the NC Association of Occupational Health Nurses (NCAOHN). This year NC OSHERC collaborated with the Sunshine ERC at the Annual Winter Institute in presenting the CAOHC Hearing Conservation Certification and Re-certification Courses. A second collaboration was with the Sunshine and Deep South ERCs at the FL Workers Compensation Institute in Orlando, FL, presenting the R2P programs including aspects of the Aging Workforce. New *Short Safety Courses*, consisting of five topic sections of 3-5 courses per section were offered in Chapel Hill and also as contract courses. Also added this year was the EPA’s Renovation, Repair, and Painting Certification Course. It is offered in both English and Spanish.

Trainee recruitment, including diversity efforts, meets the training needs of the region. The geographic statistics indicated that 85% of the trainees were from the southeast region. For 2009-2010, the diversity breakdown of attendees reporting their ethnic background was: White - 69%; Black - 21%; Hispanic - 8%; Asian - 1%; American Indian - 1%. Courses are interdisciplinary and listed in Tables requested by NIOSH. The CE Program (without HST) trained 3,669 students in 121 courses, an increase of 13 courses, despite the economic issues that continued to reduce our income by 35%.

Hazardous Substance Training - Program Director: Kathleen Buckheit, MPH, COHN-S/CM/SM

The NC OSHERC Hazardous Substance Training (HST) Program has been growing and expanding throughout the Southeast region. Several new areas of Kentucky and Tennessee have been the focus of training.

The geographic statistics indicated that 90% of the trainees were from the southeast region. For 2009-2010, the diversity breakdown of attendees reporting their ethnic background was: White - 70%; Black - 20%; Hispanic - 10%. HST courses are interdisciplinary and listed on Tables requested by NIOSH. The HST Program trained 585 students in 40 courses, an increase of 9 courses, despite the economic issues that continued to reduce our income by 45%. Over \$10,000 from the NIOSH HST grant funding was used to support training of state and local government workers and several free courses were provided.

New and exciting opportunities are being developed in the NC OSHERC. Partnerships are increasing with Local Emergency Planning Committees and Hazardous Materials and Firefighter responders. NC OSHERC is working on a Needs Assessment Program with the NC Department of Environment and Natural Resources (DENR). NC state funds were significantly restricted and allowed state employees to participate in only free training programs that were offered. The exciting new program that was implemented this year was the Telecommunications HAZMAT Specialist Certificate Program. Eleven AT&T employees met the requirements and graduated from the Certificate Program. These are telecommunications workers required to enter disaster areas to re-establish lines of communications. They are required to be experienced in telecommunications work and then successfully complete required HazMat and safety courses. We are actively working with other telecommunications organizations to expand the Certificate Program.